WHAT IS CLAIMED IS:

1. A biological microarray comprising a support having disposed thereon at least one layer comprising filler and gelatin, and at least one functional compound, wherein said functional compound comprises a first functional group capable of interacting with said gelatin and a second functional group capable of interacting with a biological capture agent, wherein said first functional group is the same as or different from the second functional group.

2. The biological microarray of claim 1 wherein said biological microarray has reduced background noise.

3. The biological microarray of claim 1 wherein said support comprises a support having dimensional stability.

4. The biological microarray of claim 1 wherein said support comprises glass.

5. The biological microarray of claim 1 wherein said support comprises a polymer.

6. The biological microarray of claim 5 wherein said polymer support has been surface treated to enhance adhesion of said at least one layer comprising filler and gelatin to said support.

7. The biological microarray of claim 1 wherein said gelatin comprises alkaline pretreated gelatin.

8. The biological microarray of claim 1 wherein said gelatin comprises bovine gelatin, pig gelatin, fish gelatin or fowl gelatin.

9. The biological microarray of claim 1 wherein said gelatin is present in an amount of from 15 to 99 % by weight of said layer.

10. The biological microarray of claim 1 wherein said filler comprises a mean particle diameter of less than 1.0 micrometers.

11. The biological microarray of claim 1 wherein said filler comprises from 1 to 85% by weight of said layer.

12. The biological microarray of claim 1 wherein said filler comprises inorganic particles, organic particles, soluble polymers or combinations thereof.

13. The biological microarray of claim 12 wherein said organic particles comprise polymer particles.

14. The biological microarray of Claim 13 wherein said polymer particles comprise water insoluble synthetic polymers.

15. The biological microarray of Claim 14 wherein said water insoluble synthetic polymers comprise at least one member selected from the group consisting of addition polymers, poly (alkylene oxides), phenol-formaldehyde polymers, urea-formaldehyde polymers and condensation polymers consisting of one or more of the following repetitive units: esters, amides, imides, carbonates, urethanes, and ethers.

16. The biological microarray of Claim 13 wherein said polymer particles comprise monodisperse polymer particles.

17. The biological microarray of Claim 16 wherein said monodisperse polymer particles have a particle size distribution, wherein the coefficient of said particle size distribution is less than 20%.

18. The biological microarray of Claim 13 wherein said polymer particles comprise polymers made from monomers containing α,β-ethylenic unsaturation.

19. The biological microarray of Claim 18 wherein said monomers have limited solubility in water.

20. The biological microarray of Claim 18 wherein said monomers comprise at least one member selected from the group consisting of styrenics, acrylic esters, methacrylic esters, acrylamides, methacrylamides, or vinyl esters.

21. The biological microarray of Claim 18 wherein said monomers comprise aliphatic acrylic esters or methacrylic esters.

22. The biological microarray of Claim 18 wherein said monomers comprise at least two ethylenically unsaturated chemical functionalities.

23. The biological microarray of Claim 22 wherein said monomers comprise at least one member selected from the group consisting of vinyl groups, acrylates, methacrylates, vinyl ethers and vinyl esters.

24. The biological microarray of Claim 18 further comprising less than 20% of the total weight of the polymerizeable solids of one or more water-soluble ethylenically unsaturated monomers.

25. The biological microarray of claim 13 wherein said polymer particles comprise chemically active groups.

26. The biological microarray of Claim 25 wherein said chemically active groups comprise at least one member selected from the group consisting of thiols, primary amines, secondary amines, tertiary amines, quaternary ammoniums, phosphines, alcohols, carboxylic acids, primary or

secondary amines, vinylsuflonyls, aldehydes, epoxies, hydrazides, succinimidyl esters, carbodiimides, maleimides, iodoacetyls, isocyanates, isothiocyanates, aziridines, or sulfonates.

27. The biological microarray of claim 12 wherein said soluble polymers comprise linear or branched soluble polymers.

28. The biological microarray of claim 12 wherein said soluble polymers comprise polymers soluble in water or water-miscible solvents.

29. The biological microarray of claim 28 wherein said soluble polymers comprise at least one member selected from the group consisting of methanol, ethanol, isopropanol, 1-methoxy-2-propanol and *n*-propanol), methyl ethyl ketone, tetrahydrofuran, acetonitrile and acetone.

30. The biological microarray of claim 12 wherein said soluble polymers comprise natural soluble polymers.

31. The biological microarray of claim 30 wherein said soluble polymers comprise polysaccharides.

32. The biological microarray of claim 12 wherein said soluble polymers comprise synthetic soluble polymers.

33. The biological microarray of claim 32 wherein said soluble polymers comprise contain greater than 1.7 mEq/g of amide, amine, and heterocyclic nitrogen groups.

34. The biological microarray of claim 12 wherein said inorganic particles comprise inorganic oxide or inorganic powder.

35. The biological microarray of claim 34 wherein said inorganic particles at least one member selected from the group consisting of silica, colloidal silica, silicon oxide dispersions, fumed silica, aluminum oxide, colloidal alumina, fumed alumina, calcium carbonate, kaolin, talc, calcium sulfate, natural or synthetic clay, barium sulfate, barium sulfate mixtures with zinc sulfide, γ-aluminum oxide, chromium oxide, iron oxide, tin oxide, doped tin oxide, alumino-silicate, titanium dioxide, silicon carbide, titanium carbide, diamond in fine powder, titanium dioxide, zinc oxide, or mixtures thereof.

36. The biological microarray of claim 34 wherein said inorganic particles colloidal particles.

37. The biological microarray of Claim 1 wherein said functional compound comprises at least a first functional group A capable of interacting with said gelatin and at least a second functional group B capable of interacting with a biological capture agent, wherein said first functional group A is the same as or different from the second functional group B, and wherein said first functional group A is connected to said second functional group B by a linking group L, wherein said L is capable of interacting with said A and with said B.

38. The biological microarray of claim 37 wherein A and B each independently comprise a member from the group consisting of aldehyde, epoxy, hydrazide, vinyl sulfone, succinimidyl ester, carbodiimide, maleimide, dithio, iodoacetyl, isocyanate, isothiocyanate, or aziridine.

39. The biological microarray of claim 37 wherein B comprises at least one member selected from the group consisting of streptavidin, biotin, glutathione-S-transferase, glutathione, or histidine.

40. The biological microarray of claim 37 wherein L comprises a diradical of such a length that the shortest through–bond path between the ends that connect A to B is not greater than 10 atoms.

41. The biological microarray of claim 37 wherein L comprises a single bond, a carbon atom, an oxygen atom, a sulfur atom, a carbonyl group, a carboxylic ester group, a carboxylic amide group, a sulfonyl group, a sulfonamide group, an ethyleneoxy group, a polyethyleneoxy group, or an amino group.

42. The biological microarray of claim 37 wherein L further comprises solubilizing groups selected from the group consisting of carboxylic acid, sulfonic acid, phosphonic acid, hydroxamic acid, sulfonamide, and hydroxy groups (and their corresponding salts).

43. The biological microarray of Claim 1 wherein said functional polymer compound is represented by Formula I:

$$-\left[\mathrm{G}\right]_{x}\left[\mathrm{H}\right]_{y}-$$

Formula I

wherein

"G" represents a polymerized α,β-ethylenically unsaturated addition polymerizeable monomer;

"H" represents a vinylsulfone or vinylsulfone precursor unit monomer; and

x and y both represent molar percentages ranging from 10 to 90 and 90 to 10.

44. The biological microarray of Claim 43 wherein G represents nonionic or ionic monomers.

45. The biological microarray of Claim 44 wherein said ionic monomers comprise at least one member selected from the group consisting of 2-phosphatoethyl acrylate potassium salt, 3-phosphatopropyl methacrylate ammonium salt, acrylamide, methacrylamides, maleic acid and salts thereof, sulfopropyl acrylate and methacrylate, acrylic and methacrylic acids and salts

thereof, N-vinylpyrrolidone, acrylic and methacrylic esters of alkylphosphonates, styrenics, acrylic and methacrylic monomers containing amine ammonium functionalities, styrenesulfonic acid and salts thereof, acrylic and methacrylic esters of alkylsulfonates, vinylsulfonic acid and salts thereof.

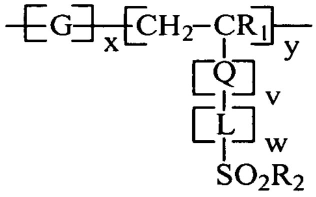
46. The biological microarray of Claim 44 wherein said nonionic monomers comprise at least one member selected from the group consisting of poly(ethylene oxide) segments, carbohydrates, amines, amides, alcohols, polyols, nitrogen-containing heterocycles, and oligopeptides.

47. The biological microarray of Claim 44 wherein said nonionic monomers comprise at least one member selected from the group consisting of poly(ethylene oxide) acrylate and methacrylate esters, vinylpyridines, hydroxyethyl acrylate, glycerol acrylate and methacrylate esters, (meth)acrylamide, and N-vinylpyrrolidone.

48. The biological microarray of Claim 43 wherein G represents the polymerized form of acrylamide, sodium 2-acrylamido-2-methanepropionate, sulfopropyl acrylate and methacrylate salts, or sodium styrenesulfonate.

49. The biological microarray of Claim 43 wherein H represents the polymerized form of a vinylsulfone or vinylsulfone precursor unit.

50. The biological microarray of Claim 43 wherein said "H" represents groups represented by Formula II:



$$-\left[G\right]_x\left[CH_2-\begin{array}{c}CR_1\\ |\\ \left[Q\right]_v\\ |\\ \left[L\right]_w\\ |\\ SO_2R_2\end{array}\right]_y-$$

Formula II

wherein:

R_1 is a hydrogen atom or a C_1-C_6 alkyl group;

Q is $-CO_2$-, or $CONR_1$.;

v is 1 or 0;

w is 1-3;

L is a divalent linking group containing at least one linkage selected from the group consisting of $-CO_2$- and -$CONR_1$, and containing 3-15 carbon atoms, or a divalent atom containing at least one linkage selected from the group consisting of –O-, -$N(R_1)$-, -CO-, -SO-, -SO_2-, -SO_3-, -$SO_2N(R_1)$-, -$N(R_1)CON(R_1)$- and $-N(R_1)CO_2$-, and containing 1-12 carbon atoms in which R_1 has the same meaning as defined above;

R_2 is -CH=CH2 or –CH2-CH2X_1 wherein X_1 is a substituent replaceable by a nucleophilic group or releasable in the form of HX_1 by a base.

51. The biological microarray of claim 1 wherein said second functional group is capable of interacting non-covalently with a biological capture agent.

52. The biological microarray method of claim 1 wherein said functional compound is disposed in said at least one layer comprising filler and gelatin.

53. The biological microarray method of claim 1 wherein said functional compound is disposed onto said at least one layer comprising filler and gelatin.

54. The biological microarray of claim 1 wherein said interacting with said gelatin comprises a physical binding or a chemical reaction.

55. The biological microarray of claim 1 wherein said interacting with said biological capture agent comprises a physical binding or a chemical reaction.

56. The biological microarray of claim 1 further comprising a biological capture agent.

57. The biological microarray of claim 56 wherein said biological capture agent comprises at least one member selected from the group consisting of antibodies, proteins, polymer scaffolds, peptides, antigens, nucleic acid ligands, or molecular imprinting polymers.

58. The biological microarray of claim 57 wherein said polymer scaffold comprises at least one polymer rich in reactive units capable of immobilizing biological compounds.

59. The biological microarray of claim 58 wherein said reactive unit comprises at least one member selected from the group consisting of aldehyde, epoxy, hydrazide, vinyl sulfone, succinimidyl ester, carbodiimide, maleimide, dithio, iodoacetyl, isocyanate, isothiocyanate, or aziridine.

60. The biological microarray of claim 58 wherein said at least one polymer comprises poly(vinylamine), poly(propyleneimine), poly(N-aminopropyl methacrylamide) or poly(n-vinylimidazole).

61. The biological microarray of claim 57 wherein said polymer scaffold comprises at least one precursor polymer.

62. The biological microarray of claim 61 wherein said precursor polymer is rich in thiols, amines, phosphines, alcohols, or carboxylic acids.

63. The biological microarray of claim 61 wherein the precursor polymer is rich in primary or secondary amines.

64. The microarray of claim 1 further comprising at least one interlayer between said at least one layer and said support.

65. The microarray of claim 1 further comprising additives.

66. A method of making a biological microarray element comprising:

providing a support; and

coating a layer comprising filler and gelatin and at least one functional compound, wherein said functional compound comprises a first functional group capable of interacting with said gelatin and a second functional group capable of interacting with a biological capture agent, wherein said first functional group is the same as or different from the second functional group.

67. The method of Claim 66 wherein said coating comprises simultaneous coating.

68. The method of Claim 66 wherein said coating comprises sequential coating.

69. The method of Claim 66 further comprising modifying said support prior to coating said layer comprising filler and gelatin and said at least one functional compound.